REMARKS

Reconsideration and allowance in view of the foregoing amendments and the following remarks are respectfully requested. Claims 1, 17-21 and 23 are amended. Claim 22 is cancelled. Favorable consideration of pending Claims 1-4, 6-21 and 23-28 is respectfully requested.

Rejections Under 35 U.S.C. §101

In response to the rejection of Claims 11-16 and 17-22 under 35 U.S.C. §101, the Applicant respectfully disagrees.

With respect to Claim 11, the Office seems to indicate that a post-computer process activity is required under 35 U.S.C. §101. This is not the case. As stated by the MPEP, a "claim may still be statutory if it is limited to a practical application in the technological arts". *MPEP, 2606(IV)(B)(2)(b)(ii)*. For instance, the MPEP provides the following examples:

> For example, a computer process that simply calculates a mathematical algorithm that models noise in nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory. *Id.*

> A digital filter process for removing noise from a digital signal comprising the steps of calculating a mathematical algorithm to produce a correction signal and subtracting the correction signal from the digital signal to remove the noise. *Id.*

Claim 11 recites a "method for predicting a likelihood of an item in a corpus comprised of a plurality of items" which includes "building a data structure of corpus segments representing a dynamic context of item dependencies within the

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segments", "calculating the likelihood of each item based, at least in part, on a likelihood of preceding items within the dynamic context", "iteratively re-segmenting the corpus", and "predicting a likelihood of an item in the re-segmented corpus". Thus, like the preceding examples taken from the MPEP, Claim 11 recites use of the process in a practical application, e.g., "predicting a likelihood <u>of an item in a corpus</u>" (emphasis added), as opposed to merely reciting a mathematical algorithm. Further, Claim 11 recites a practical application and recites a step or act of producing something that is concrete, tangible and useful, i.e. "predicting a likelihood of an item in a resegmented corpus". Examples of uses of the predicted likelihood are recited in the subject Application, and include web browsers, word processors, speed recognition applications, and so on. *See subject Application, Page 1.* Therefore, even thought the predicted likelihood may be utilized in a variety of ways, this does remove the statutory basis of this claim, i.e., a practical application of use with a corpus is claimed. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 17 has been amended, and as amended, recites a storage medium having computer-executable instructions to "generate, from a corpus, a data structure representing a statistical language model", and thus falls within well-understood boundaries of statutory subject matter. Accordingly, withdrawal of the rejection of Claims 17-21 is respectfully requested.

Rejections Under 35 U.S.C.§103

Claims 1-4 and 6-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Marquez, titled "Statistical Learning" (hereinafter "Marquez") in view of U.S. Patent No. 5,696,962 to Kupiec (hereinafter "Kupiec"). The Applicant respectfully traverses the rejections.

Claim 1 has been amended, and as amended, recites a method which includes:

- assigning each of a plurality of segments comprising a received corpus to a node in a data structure denoting dependencies between nodes;

- calculating a transitional probability between each of the nodes in the data structure; and

- managing storage of the data structure across a system memory of a computer system and an extended memory of the computer system *such that at least one said node is stored in the system memory and another said node is stored in the extended memory simultaneously.*

Support for the amendment may be found throughout the specification and. drawings as filed, an example of which may be found at pages 14-15 of the subject application. Neither Marquez nor Kupiec, alone or in combination, disclose, teach or suggest these aspects.

Beginning at page 15 of the subject application, an exemplary implementation of management of a data structure in memory is described. According to one aspect of the invention, data structure memory manager utilizes

system memory as well as extended memory to maintain the DOMM data structure. More specifically, data structure memory manager employs a WriteNode function and a ReadNode function to maintain a subset of the most recently used nodes of the DOMM data structure in a first level cache of a system memory, while relegating least recently used nodes to extended memory (e.g., disk files in hard drive, or some remote drive), to provide for improved performance characteristics. In addition, a second level cache of system memory is used to aggregate write commands until a predetermined threshold has been met, at which point data structure memory manager make one aggregate WriteNode command to an appropriate location in memory.

Marquez does not disclose, teach or suggest managing storage of the data structure as claimed. Indeed, Marquez does not even mention a memory. To correct the defects of Marquez, the Office asserts portions of Kupiec, which are excerpted as follows:

> The computing node 4 can in some embodiments further comprise a storage device 8, such as a hard disk, coupled to the processor 5. *Kupiec, Col. 6, Lines 29-31.*

> In a system comprising a processor, a memory coupled to the processor, a user interface coupled to the processor, a storage device coupled to the processor, a primary query construction subsystem executed by the processor, a computerized information retrieval (IR) system coupled to a text corpus, and a channel connecting the primary query construction subsystem and the information retrieval subsystem and the information retrieval subsystem with one another, a method for retrieving documents from the text corpus in response to a user-supplied natural language questions comprising words, the method comprising the steps of: *Kupiec, Col. 42, Lines 13-23.*

Neither the above asserted portions, nor elsewhere in Kupiec, alone or in combination with Marquez, is the managing feature of Claim 1, as amended, disclosed, taught or suggested. Therefore, withdrawal of the rejection of claim 1 is respectfully requested.

Claims 2-4 and **6-10** depend either directly or indirectly from claim 1. Accordingly, these claims are allowable for at least this reason. Additionally, these claims are also allowable based on their own recited features, which are not disclosed, taught or suggest by Marquez or Kupiec, alone or in combination. For example, neither Marquez nor Kupiec, alone or in combination, teach or suggest "identifying least recently used nodes of the data structure" and "storing the least recently used nodes of the data structure in the extended memory of the computer system when the data structure is too large to store completely within the system memory" as recited in claim 6. Therefore, withdrawal of the rejections of claims 2-4 and 6-10 is respectfully requested.

Claim 11 recites a method for predicting a likelihood of an item in a corpus comprised of a plurality of items, the method comprising:

- building a data structure, across a system memory of a computer system and an extended memory of the computer system, of corpus segments representing a dynamic context of item dependencies within the segments;
- calculating the likelihood of each item based, at least in part, on a likelihood of preceding items within the dynamic context;
- iteratively re-segmenting the corpus; and
- predicting a likelihood of an item in the re-segmented corpus.

Neither Marquez nor Kupiec, alone or in combination, disclose, teach or suggest these aspects.

As previously described in relation to claim 1, Marquez does not disclose, teach, suggest or even mention a memory. The Office again asserts Kupiec at column 6, lines 29-31 to correct the defects of Marquez, namely "for a data structure, across a system memory of a computer system and an extended memory of the computer system". *See Office Action Dated March 18, 2005, Page 7.* Although Kupiec does mention a memory, Kupiec does not disclose, teach or suggest the building feature as claimed in claim 11. Accordingly, it is respectfully submitted that this claim, as amended, is not unpatentable over Marquez or Kupiec, alone or in combination. Therefore, withdrawal of the rejection of claim 11 is respectfully requested.

Claims 12-16 depend either directly or indirectly from claim 11. Accordingly, these claims are allowable for at least this reason. Additionally, these claims are also allowable based on their own recited features, which are not disclosed, taught or suggest by Marquez. Therefore, withdrawal of the rejections of claims 12-16 is respectfully requested.

Claim 17 has been amended, and as amended (portions of the amendment appear in bold/italics) recites a *storage medium comprising executable instructions that are configured to generate, from a corpus, a* data structure *representing* a statistical language model, the data structure *for storage across a system memory and an extended memory, the data structure* including: one or more root nodes; and a plurality of subordinate nodes, ultimately linked to a root node, cumulatively comprising one or more sub-trees, wherein each node of a

sub-tree represents, one or more items of a corpus and includes a measure of a Markov transition probability between the node and another linked node. Neither Marquez nor Kupiec, alone or in combination, disclose, teach or suggest these aspects.

Again, as previously described in relation to claims 1 and 11, Marquez does not disclose, teach, suggest or even mention a memory. Although Kupiec does describe a memory, neither Kupiec does not disclose, teach or suggest "data structure for storage across a system memory and an extended memory" as recited in claim 17. Accordingly, it is respectfully submitted that neither Marquez not Kupiec, alone or in combination, disclose, teach or suggest these aspects. Therefore, withdrawal of the rejection of Claim 17 is respectfully requested.

Claims 18-21 and **23** depend either directly or indirectly from claim 17. Accordingly, these claims are allowable for at least this reason. Additionally, these claims are also allowable based on their own recited features, which are not disclosed, taught or suggest by Marquez. Therefore, withdrawal of the rejections of Claims 18-21 and 23 is respectfully requested.

Claim 24 recites a modeling agent comprising "a controller, to receive a corpus" and "a data structure generator, responsive to and selectively invoked by the controller, to assign each of a plurality of segments comprising the received corpus to a node in a data structure denoting dependencies between nodes" in which "the modeling agent calculates a transitional probability between each of the nodes of the data structure to determine a predictive capability of a language model represented by the data structure and iteratively re-segments the received

corpus until a threshold predictive capability is reached". Neither Marquez nor Kupiec, alone or in combination, disclose, teach or suggest these aspects.

The Office asserts sections of Kupiec and Marquez for teaching "iteratively re-segments the received corpus until a threshold predictive capability ... is reached". *Office Action Dated March 18, 2005, Page 10*. However, in none of the asserted sections is a "threshold predictive capability" as recited by Claim 24 taught or suggested. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Ryoka*, 180 U.S.P.Q. 580 (C.C.P.A. 1974). *See also In re Wilson*, 165 U.S.P.Q. 494 (C.C.P.A. 1970). Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has not been established because Marquez and Kupiec, alone or in combination, fail to teach or suggest "iteratively re-segments the received corpus until a threshold predictive capability is reached" as recited in claim 24. Therefore, withdrawal of the rejection of claim 24 is respectfully requested.

Claims 25-27 depend either directly or indirectly from claim 24. Accordingly, these claims are allowable for at least this reason. Additionally, these claims are also allowable based on their own recited features, which are not disclosed, taught or suggested by Marquez or Kupiec, alone or in combination. Therefore, withdrawal of the rejections of Claims 25-27 is respectfully requested.

Claim 28 recites a "storage medium comprising a plurality of executable instructions including at least a subset of which, when executed, implement a language modeling agent" which is not disclosed, taught or suggested by

Marquez. Indeed, Marquez does not even mention executable instructions. As previously described, Kupiec does not correct this defect.

Further, claim 28 recites "wherein the modeling agent dynamically re-segments the received corpus to remove segments which do not meet a minimum frequency threshold" which is not disclosed, taught or suggested by Marquez. The Office asserts pages 18, 20 and 24 of Marquez for such disclosure. The Applicant respectfully disagrees. The asserted pages merely describe a naïve Bayes stochastic model and a hidden Markov model. Kupiec also does not correct this defect.

Beginning at page 13 of the subject application, however, exemplary removal of segments is described. For example, the number of characters employed as context (j) by Markov probability calculator is a "dynamic" quantity that is different for each sequence of characters C_i, C_{i-1}, C_{i-2}, C_{i-3}, etc. According to one implementation, the number of characters relied upon for context (j) by Markov probability calculator is dependent, at least in part, on a frequency value for each of the characters, i.e., the rate at which they appear throughout the corpus. More specifically, if in identifying the items of the corpus Markov probability calculator does not identify at least a minimum occurrence frequency for a particular item, it may be "pruned" (i.e., removed) from the tree as being statistically irrelevant. According to one embodiment, the minimum frequency threshold is three (3).

Neither Marquez nor Kupiec, alone or in combination, teach or suggest a language modeling agent that "dynamically re-segments the received corpus to remove segments which do not meet a minimum frequency threshold" as recited

in claim 28. Accordingly, for this reason and the previously recited reasons, a *prima facie* case of obviousness has not been established. Withdrawal of the rejection with respect to Claim 28 is respectfully requested.
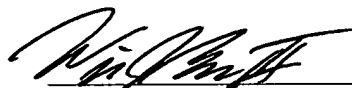
CONCLUSION

All objections and rejections having been addressed, it is respectfully submitted that the present application is now in condition for allowance. Early and forthright issuance of a Notice of Allowability is respectfully requested.

Respectfully Submitted,

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